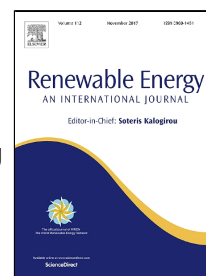


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Electrochemical hydrogen storage properties of NiAl₂O₄/NiO

nanostructures using TiO₂, SiO₂ and graphene by auto-combustion method using green tea extract

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Abstract

NiAl₂O₄/NiO nanostructures were synthesized via an auto-combustion method using green tea extract. TiO₂, SiO₂, and graphene were used in order to enhance the electrochemical hydrogen storage performance of NiAl₂O₄. The structural analysis of host texture confirmed the formation of NiO alongside with NiAl₂O₄. Furthermore, the formation of nanocomposites and distribution of the additives on the surface of NiAl₂O₄/NiO nanostructures were affirmed by XRD and EDS spectra. The morphological analyses were displayed the nanoscale formation of the particles. Interestingly, the electrochemical hydrogen storage of the nanocomposites indicated that upon addition of TiO₂, SiO₂ and graphene, the discharge capacity enhanced as compare to the host material. The maximum discharge capacities of NiAl₂O₄/NiO and its respective nanocomposites containing SiO₂, graphene, and TiO₂ were observed at 850, 2000, 2750 and 3000 mAh/g, respectively.

Keywords: Spinel; Nanostructures; Hydrogen storage; Mesoporous; Chronopotentiometry.

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